What is claimed is:

1. A method of fabricating an interconnect structure, comprising:

(a) providing a substrate having a film stack formed thereon;

(b) patterning and etching a first feature in the film stack;

(c) forming a bi-layer mask comprising an organic film and an imaging film on the film stack;

(d) patterning the bi-layer mask;

(e) etching a second feature in the film stack using the patterned bi-layer mask as an etch mask; and

(f) metallizing the first and second features to form the interconnect structure.

2. The method of claim 1 wherein the film stack comprises a first barrier layer, a conductive layer embedded in a first dielectric layer, a second barrier layer and a second dielectric layer.

3. The method of claim 2 wherein at least one of a capping layer and a sacrificial layer is formed on the second dielectric layer.

4. The method of claim 3 wherein the sacrificial layer comprises at least one of amorphous silicon, titanium nitride (TiN) and tungsten (W).

5. The method of claim 2 wherein the first dielectric layer and the second dielectric layer each comprise at least one of carbon doped silicon oxide, organic doped silicon glass and fluorine doped silicon glass.

6. The method of claim 2 wherein the first barrier layer comprises at least one of silicon dioxide ($SiO_2$) and silicon nitride ($Si_3N_4$).

7. The method of claim 2 wherein the second barrier layer comprises silicon carbide (SiC).

8. The method of claim 2 wherein the conductive layer comprises at least one of

copper (Cu), aluminum (Al), tantalum (Ta), tungsten (W), titanium (Ti), tantalum nitride (TaN) and titanium nitride (TiN).

9. The method of claim 1 wherein the first feature is a trench and the second feature is a contact hole.

10. The method of claim 1 wherein the first feature is a contact hole and the second feature is a trench.

11. The method of claim 1 wherein the first feature is formed by patterning and etching a trench in the film stack to a pre-determined depth.

12. The method of claim 11 wherein the second feature is formed by patterning a contact hole in the bi-layer mask.

13. The method of claim 12 wherein the step (e) further comprises:

using a portion of the organic film in the trench as an etch mask so as to remove lithographic misalignment between the contact hole and the trench when the contact hole is etched.

14. The method of claim 9 wherein step (b) comprises:

etching the trench in the film stack comprising a dielectric material to a pre-determined depth by providing carbon tetrafluoride ($CF_4$) and nitrogen ($N_2$) at a $CF_4$:$N_2$ flow ratio in a range from 1:4 to 2:3.

15. The method of claim 13 wherein step (e) comprises:

etching the contact hole in the organic layer to a pre-determined depth by providing ammonia ($NH_3$) and oxygen ($O_2$) at a flow ratio $NH_3$:$O_2$ in a range from 1:1 to 100 percent ammonia.

16. The method of claim 1 further comprising a step of planarizing the metallized interconnect structure to remove the sacrificial layer and at least a portion of the capping layer.

17. The method of claim 1 wherein the first feature is formed by patterning and etching a contact hole in the film stack to a predetermined depth.

18. The method of claim 17 wherein the second feature is formed by patterning a trench in the bi-layer mask.

19. The method of claim 18 wherein a portion of the organic material in the contact hole is used as an etch mask when the trench is formed in the film stack.

20. The method of claim 17 wherein step (b) comprises:

etching the contact hole in the film stack comprising a dielectric material to a pre-determined depth by providing carbon tetrafluoride ($CF_4$) and nitrogen ($N_2$) at a $CF_4$:$N_2$ flow ratio in a range from 1:4 to 2:3.

21. The method of claim 18 wherein step (e) comprises:

etching the trench in the organic layer to a pre-determined depth by providing ammonia ($NH_3$) and oxygen ($O_2$) at a flow ratio $NH_3$:$O_2$ in a range from 1:1 to 100 percent ammonia.

23. A method of fabricating an interconnect structure, comprising:

(a) providing a substrate having a film stack formed thereon;

(b) patterning and etching a trench in the film stack;

(c) forming a bi-layer mask comprising an organic film and an imaging film on the film stack;

(d) patterning the bi-layer mask;

(e) etching a contact hole in the film stack using the patterned bi-layer mask as an etch mask; and

(f) metallizing the trench and the contact hole to form the interconnect structure.

24. The method of claim 23 wherein the trench is etched a pre-determined depth in the film stack.

25. The method of claim 23 wherein the step (e) further comprises:

using a portion of the organic film in the trench as an etch mask so as to remove lithographic misalignment between the contact hole and the trench when the contact hole is etched.

26. A method of fabricating an interconnect structure, comprising:

(a) providing a substrate having a film stack formed thereon;

(b) patterning and etching a contact hole in the film stack;

(c) forming a bi-layer mask comprising an organic film and an imaging film on the film stack;

(d) patterning the bi-layer mask;

(e) etching a trench in the film stack using the patterned bi-layer mask as an etch mask; and

(f) metallizing the contact hole and the trench to form the interconnect structure.

27. The method of claim 26 wherein the contact hole is etched a pre-determined depth in the film stack.

28. The method of claim 26 wherein the step (e) further comprises:

using a portion of the organic film in the contact hole as an etch mask so as to remove lithographic misalignment between the contact hole and the trench when the trench is etched.

29. A method for compensating a misalignment between a trench and a contact hole, comprising:

providing a substrate having a film stack formed thereon;

patterning and etching a trench in the film stack;

forming a bi-layer mass comprising an organic film and an imaging film on the film stack covering the trench;

patterning a contact hole in the bi-layer mask;

etching a contact hole structure through the bi-electric mask;

etching a sidewall of the trench to correct misalignment between the pattern contact hole and the trench to form an aligned hole structure through a portion of the film stack; and

etching a via through the aligned hole structure to couple the trench with an underlying metal line.